

FREQUENCY MEASURING DEVICE, POLISHING DEVICE  
USING THE SAME AND EDDY CURRENT SENSOR

## ABSTRACT OF THE DISCLOSURE

Disclosed is a frequency measuring device capable of  
5 accurately detecting an end point of polishing a  
semiconductor wafer by obtaining a frequency measurement  
result highly accurately in a short period of time. A  
device FC for measuring the frequency of a measured signal.  
10 Vin comprises a counting section including a number i (i 2)  
of n-nary counters 1 - i, a time reference circuit 13 which  
outputs a time reference signal T, whose duration is t,  
every time interval p, and a number I of gate circuits G1  
15 to Gi whose outputs are connected to the inputs of the  
n-nary counters 1 - i. The gate circuits receive the  
measured signal Vin at a first input and receive the time  
reference signal T at time intervals p at a second input.  
With this structure, the counting section supplies the  
frequency measured result of the measured signal Vin every  
time interval p.

20 Further, the present invention provides an eddy  
current sensor capable of stable operation is provided for  
accurately detecting a polishing end point. The eddy  
current sensor detects the thickness of a conductive film  
from a change in an eddy current loss generated in the  
25 conductive film. The eddy current sensor comprises a  
sensor coil for generating an eddy current in the  
conductive film, and an active element unit connected to  
the sensor coil for oscillating a variable frequency  
corresponding to the eddy current loss. The sensor coil  
30 and active element unit are integrated to form the eddy  
current sensor. Alternatively, the eddy current sensor  
comprises a sensor coil for generating an eddy current in  
the conductive film, and a detector for detecting a change  
in the thickness of the conductive film from a change in a  
35 resistance component (R) in an impedance formed by the  
sensor coil and conductive film.